

R E M A R K S

The Office Action mailed November 26, 2004 has been reviewed and carefully considered. The Examiner's allowance of claims 13-15 is appreciated. Claims 1-25 remain pending, the independent claims remaining 1, 7, 16 and 22. The independent claims, 1, 7, 16, and 22, have been amended. Reconsideration of the above-identified application, as amended and in view of the following remarks, is respectfully requested.

Claims 1-2 and 16-17 stand rejected under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 5,604,546 to Iwata.

Claim 1, as amended, recites:

each D-unit array being configured for calculating the pixel-to-pixel differences between the pixels of a current frame and the corresponding pixels of a reference frame and for converting the differences to absolute values; and at least one accumulator unit (A-unit) including a plurality of accumulators, said accumulator unit being connected to the D-unit arrays for generating an SAD (Sum of Absolute Difference) for each smallest size matching block, and an SAD for all of the plurality of matching blocks of pixels having non-uniform sizes by hierarchical addition of the absolute values of the smallest size matching blocks received from the D-unit arrays

Iwata fails to disclose or suggest the above-quoted feature of claim 1.

What presumably the Office Action deems to be the "smallest size matching block" of claim 1 is a 3x2 array in FIG. 7 corresponding to the odd number

field or, alternatively, to the even number field (col. 14, lines 45-52). The odd number field is comprised of the odd number columns/rows of the pixels of a frame, and the even number field is comprised of the even number columns/rows of pixels of a frame (col. 5, line 66 – col. 6, line 4).

However, as seen in FIG. 7, a single accumulator 341 interfaces with PEs of either field; whereas, claim 1 as amended recites “a plurality of accumulators.”

For at least this reason, Iwata fails to anticipate claim 1 as amended.

Moreover, it would not have been obvious to modify Iwata to resemble the present invention as recited in claim 1.

Iwata utilizes a general structure of PE as shown in FIGs. 8A, 8B; whereas, the present invention separates A-unit functionality from D-unit functionality and features an A-unit having a plurality of accumulators.

According to Iwata, addition of SAD for the even field and the odd field are performed only at the end of the image signal processing apparatus (FIG. 7, #341), so that the SAD cannot be output for various block sizes. For at least this reason, Iwata fails to embody a hierarchical arrangement of accumulators (see present FIG. 7) that would afford the output of various SAD block sizes.

Support for the amendment of claim 1 is found in the specification (e.g., page 10, lines 9-15; page 11, lines 13-17) and FIGs. 5 and 6.

Claim 16, as amended, recites:

generating an SAD for all of the plurality of matching blocks of pixels having non-uniform sizes by hierarchically adding, by a plurality of accumulators disposed externally from, and connected to, the D-unit arrays, the absolute values of the smallest size matching blocks

Claim 16 is likewise distinguished over Iwata, at least by virtue of the same reasons set forth above with regard to claim 1.

Claims 7 and 22 stand rejected under 35 U.S.C. 103(a) as unpatentable over Iwata in view of U.S. Patent No. 6,519,005 to Bakhmutsky et al. ("Bakhmutsky").

Claim 7, as amended, recites, "at least one accumulator unit (A-unit) including a plurality of accumulators, said accumulator unit being connected to the D-unit arrays."

Bakhmutsky discloses a method of performing motion estimation for each of a plurality of different prediction modes such as frame/field/dual-prime estimation for frame image, but cannot make up for the shortcomings of Iwata.

For at least the foregoing reasons, claim 7 as amended likewise distinguishes patentably over the applied references.

Support for the amendment of claim 7 is found in the specification (e.g., page 10, lines 9-15; page 11, lines 13-17) and FIGs. 5 and 6.

Claim 22 likewise distinguishes over Iwata, at least due to the same

language added by amendment.

Claims 3-6, 8-9, 18-21 and 23 stand rejected under 35 U.S.C. 103(a) as unpatentable over Iwata.

Due to their dependency from respective base claims as amended, these dependent claims overcome this basis for rejection as set forth in the above analysis.

Claims 10-12 and 24-25 stand rejected under 35 U.S.C. 103(a) as unpatentable over Iwata in view of U.S. Patent No. 5,696,836 to Yoshino et al. (“Yoshino”).

Yoshino discloses a method of performing motion estimation by calculating a sum of absolute errors for row in full search block matching, but cannot make up for the deficiencies in Iwata.

Each of the other rejected claims depends from a respective base claim and is deemed to patentably distinguish over the applied references at least due to its dependency.

In view of the foregoing amendments and remarks, it is believed that this application is now in condition for allowance. The Examiner is invited to contact the undersigned in the event of any perceived outstanding issues so that passage of the case to issue can be effected without the need for a further Office Action.

Amendment
Serial No. 09/905,096

Docket No. 5000-1-121N.

In the event that any additional fee is required to continue the prosecution of this Application as requested, please charge such fee to Deposit Account No. 502-470.

Respectfully submitted,

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